Appendix A: Growing the Economy and Providing Jobs

Natural and rural lands and historic properties are an indispensable part of the infrastructure that drives North Carolina's economy and creates jobs:

- Two of North Carolina's oldest and largest industries, **agriculture** and **forestry**, grow their products from the soil.
- Other industries, including **tourism**, **military bases** and **fishing**, are dependent on the healthy, beautiful and quiet environment that comes from natural and rural land. Historic sites and communities that retain elements of their historic character are also popular draws for tourists and citizens alike.
- Scenic beauty, historic sites and places to enjoy the outdoors help recruit and retain **high tech** workers in North Carolina.
- Renovation and reuse of historic buildings also **provide construction jobs**, **save on landfill costs** and **reduce the conversion of rural land** that is valuable for other industries such as agriculture, forestry and tourism.

Agriculture

Key Finding: Agriculture generates almost \$7 billion annually in cash receipts to North Carolina's economy. North Carolina ranks among the top five states in the nation in items as diverse as tobacco, turkeys, sweet potatoes, hogs, trout, greenhouse and nursery plants, blueberries and pickling cucumbers. However, between 1987 and 1997, North Carolina lost more prime farmland to development than any state other than Texas and Ohio.

Agriculture has been a major part of North Carolina's economy for hundreds of years. Some of the state's earliest crops included corn, beans, peas, squash, wheat and tobacco.¹

Today agriculture is still a major industry in North Carolina, generating more than \$6.9 billion in cash receipts in 2003.² In fact, North Carolina has the seventh largest farm industry in the United States.³ Our farmers produce over 80 different commodities, ranking among the top five states in the nation in items as diverse as tobacco, turkeys, sweet potatoes, hogs, trout, greenhouse and nursery plants, blueberries and cucumbers for pickles.⁴ As they adjust to changes in the farm economy, including those caused by declining demand for tobacco and an increasingly competitive world marketplace, our farmers are experimenting with new crops and products, such as truffles⁵ and specialty pork.⁶

A major threat to the long-term viability of farming in North Carolina is the rapid development of prime agricultural soils, particularly those close to urban markets. Although we cannot know how farm economies will change in the future, we do know that good soils will always be one of the bases of a successful agricultural industry. Creation of fertile soils takes thousands of years. If we allow these soils to be bulldozed and paved, we will destroy a precious resource forever.

In 1987, North Carolina had 6,907,800 acres of prime farmland,⁷ the best land for productive farming.

¹Powell, William S. 1989. North Carolina through Four Centuries. The University of North Carolina Press. p. 131-133.

²NC Department of Agriculture and Consumer Services. 2000-2003. Farm income: cash receipts from farming by commodity. www.agr.state.nc.us/ stats/cashrcpt/cshcomyv.htm

³ USDA National Agricultural Statistics Service: http://www.usda.gov/nass/pubs/stathigh/2003/econindex.htm

⁴NC Department of Agriculture and Consumer Services. How NC agriculture compares with other states, 2002 production. www.agr.state.nc.us/ stats/nc-rank/ncrallyr.htm

⁵Collins, Kristin. Some NC growers hope pricey fungi save the farm. August 2, 2004. The News & Observer, Raleigh.

⁶Houston, Susan. Porks' new pitch. March 14, 2004. The News & Observer. Raleigh.

⁷ Farming on the Edge: Sprawling Development Threatens America's Farmland. 2002. American Farmland Trust. www.farmland.org.

Ten years later, in 1997, 335,000 or 4.8% of these acres were developed.⁸ North Carolina lost more prime farmland to development in those years than any state other than Texas and Ohio. Map 2 from American Farmland Trust's study <u>Farming on the Edge</u> shows areas of high quality farmland in the state under the greatest development pressure.⁹

In addition to the permanent loss of prime soils, development of farmland creates other problems which drive up costs and lower profits for farmers and related businesses. When a number of farms are developed in a traditional farming community, it can be difficult for the remaining farmers to drive their equipment on the roads due to increased traffic. They must deal with complaints about farming practices from new neighbors. Local feed stores, tractor dealerships and other farm services may go out of business as farms in the area close down, and the remaining farmers must drive long distances to get the services they need. All these additional costs may be enough to drive a farm out of business and continue the cycle of farms being sold for development.

<u>Key Recommendation</u>: To sustain a strong agricultural industry, we must keep a critical mass of productive farmland available for agricultural use.

Fortunately there is a way to protect high-quality farmland while also helping farmers transition to new business models. Several states in the country, including Maryland, Pennsylvania and Vermont, have developed farmland protection programs to save prime soils and maintain a vibrant farm economy¹⁰ by providing funding for purchase of development rights (PDR) programs.

PDR programs allow farmers to be compensated for a voluntary agreement to permanently restrict future non-agricultural development on the land. A restriction is placed on the deed of the land, ensuring that the land will forever be available for agricultural use. Farmers enter into the agreement voluntarily and are compensated for their development rights so that they do not lose equity in their farm. Because the development rights have been removed from the land, which remains in private hands and may still be sold or passed along to heirs, the farm is valued at a price that reflects its agricultural value, rather than its development value.

The cash paid to farmers through these programs helps farmers and the agricultural industry in a variety of ways. Farmers seeking to develop new value-added enterprises can use the cash to reinvest in the farm and new businesses. Aging farmers can pay off debts or provide for their heirs. Heirs who want to keep the farm benefit because estate taxes may be lower on protected farms. Finally, young farmers who need affordable land to enter the profession benefit because protected farms are available at a lower price than unrestricted land.

⁸ Ibid.

⁹ High-quality farmland is defined by American Farmland Trust as 1) soils classified by US Department of Agriculture as "prime farmland" and 2) farmland that is used to grow vegetables, grapes and horticultural crops, including fruits, nuts and berries that have unique soil and climactic requirements. Areas shown on the map in red have greater than the statewide average of high-quality soils and also are experiencing a rate of development greater than the statewide average, providing they had at least 1000 acres developed between 1992 and 1997.

¹⁰ The National Assessment of Agricultural Easement Programs, a joint project of American Farmland Trust and the Agricultural Issues Center, University of California, Davis. 2004. www.aftresearch.org/PDRdatabase/NAPidx.htm

A recent survey conducted of farmers who used Kentucky's PDR program reveals that 93% feel that the PDR program has helped them keep their property in agriculture. They have used the funds they received from selling their development rights in a variety of ways including paying down debt (52% of farmers), purchasing farm equipment (41%), constructing or improving buildings on the farm (39%) and retaining ownership of the property for agriculture (39%).¹¹

North Carolina has only taken the first tentative steps toward a PDR program through the NC Farmland Preservation Trust Fund (FPTF), which was created by the NC General Assembly in 1986. FPTF grants, as well as several county-level farmland protection funds that have been established recently, can be used as matching dollars to draw funds from the federal Farm and Ranch Land Protection Program. However, since 1986, only \$5 million from state, federal and local funds has been used for PDR programs. Of that \$5 million, just a little over half, \$2.6 million, came from state funds. ¹² With an increased state allocation to the FPTF, North Carolina would be eligible for additional federal funding.

In November 2003, the Land for Tomorrow Coalition conducted a poll of 400 owners of farmland to learn more about their interest in farmland protection techniques.¹³ Only 39% were familiar with the Farmland Preservation Trust Fund. However, when given a brief explanation of PDR, 64% of farmers thought it sounded like a good idea. The poll also revealed the need to act quickly as 84% of respondents were 50 or older, and 48% say their children will not farm the land they own in the future. Fifty-six percent say the only people buying farms in their area are developers.

Another indication of farmer interest in protecting working farms is the increase in the number of Voluntary Agricultural Districts (VADs) in North Carolina. First authorized in 1985 by the NC Legislature, VADs allow counties to adopt farmland preservation ordinances which designate areas where commercial agriculture is encouraged and protected. They provide a series of benefits to farmers willing to restrict non-agricultural development for ten years. Thirty-nine North Carolina counties are participating in this voluntary program. Over 2,300 farms covering 200,000 acres had enrolled as of June 2004.¹⁴ VADs are a good first step towards farmland preservation, but they are non-binding and have limited time periods.

Other states have already taken bold steps to help their farmers and agricultural communities on a larger scale. Of the states that have strong farmland protection programs, Pennsylvania is most similar to North Carolina in terms of the size of its agricultural economy (Table A1).¹⁵ Since Pennsylvania launched its first PDR program in 1988, it has protected 274,000 acres, 3.5% of its total farm acres and a full 7% of its prime farmland acres. North Carolina's program is two years older than Pennsylvania's program, and yet we have protected only 2% of the amount of land that Pennsylvania has (274,000 v. 5,704 acres). Pennsylvania has made its investment in the future of its farming economy at a total cost of only \$3.42 per state resident.¹⁶

¹¹ Maurer, Richard C. 2004. Use of funds from the Kentucky Purchase of Agricultural Conservation Easements Program: Results from the survey of PACE participants. Cooperative Extension Service, University of Kentucky – College of Agriculture. Available through www.farmland.org.

¹² Conservation Trust for North Carolina. 2004. Report on the Farmland Preservation Trust Fund to the Environmental Review Commission of the NC General Assembly.

¹³ Land for Tomorrow. November 2003. Survey results from farmland owner poll. See Appendix F of this report or www.landfortomorrow.org.

¹⁴ Upton, George et al. 2004. NC voluntary agricultural districts: a progress report. American Farmland Trust. www.farmland.org/southeast/northcarolina.htm

¹⁵ USDA National Agricultural Statistics Service. State summary highlights. 2002 Census of Agriculture. www.nass.usda.gov/census/census02/volume1/ us/index1.htm

¹⁶ PDR statistics from American Farmland Trust, September 2003, www.farmland.org

Table A1: North Carolina and Pennsylvania Agricultural and PDR Statistics, 2002			
	North Carolina	Pennsylvania	
Acres in farms	9,079,001	7,745,336	
Acres of prime farmland ¹⁷	6,572,800	3,856,700	
# of farms	53,930	58,105	
Acreage per farm (avg.)	168	133	
Market value of agricultural products	\$6.96 billion	\$4.26 billion	
Prime acres lost 1987-1997 ¹⁸	335,400	244,600	
% Farm acres lost	3.7%	3.2%	
Acres protected	5,704	274,000	
% Farm acres protected	0.1%	3.5%	
PDR funding	\$5.0 million	\$603 million	
Cost of PDR per capita	\$0.05	\$3.42	

Tourism

Key Finding: North Carolina is the sixth most visited state in the country in large part because visitors think of North Carolina as a "state where you can enjoy unspoiled natural beauty in a restful and relaxing atmosphere." In 2003, visitors spent \$12.6 billion and provided jobs for 183,220 North Carolinians.

In the late 1930s North Carolina began its first advertising campaign designed to attract visitors to the state. Before leaving office in 1940, Governor Clyde R. Hoey observed that tourism during the previous four years had grown from a \$36 million to a \$102 million industry.¹⁹

Today tourism is a vital component of the state's economy. In 2003 North Carolina was the sixth most visited state in the United States, with 49 million tourists. That year, visitors spent \$12.6 billion, provided jobs for 183,220 North Carolinians and generated \$1.1 billion in taxes to state and local governments.²⁰

Why do people choose to visit North Carolina over other destinations? Surveys reveal that visitors think of North Carolina as a "state where you can enjoy unspoiled natural beauty in a restful and relaxing atmosphere."²¹ The state uses beautiful landscape images from rural communities and natural areas around the state in its advertising campaigns.

The NC Division of Tourism, Film and Sports Development publishes a list each year of the state's top 25 tourist attractions.²² Fourteen of these attractions depend on the beauty of our natural lands, the small towns and rural crossroads that welcome visitors and historic landscapes and structures that define our state (Table A2). The long-term economic viability of these places depends on the land, the scenery and sense of community remaining intact.

¹⁷ High-quality farmland acreage as of 1997, provided by American Farmland Trust. www.farmland.org

¹⁸ Farming on the Edge: Sprawling Development Threatens America's Farmland. 2002. American Farmland Trust. www.farmland.org.

¹⁹ Powell, William S. 1989. North Carolina through Four Centuries. The University of North Carolina Press. p. 497.

²⁰ Travel Industry of America. US Travel Data Center and TravelScope surveys. 2003 and 2002 data.

http://www.nccommerce.com/tourism/econ/facts.asp

²¹ Minges, Lynn D. 2004. Keeping North Carolina tourism in the winners' circle. Governor's Conference on Travel and Tourism.

²² NC Department of Commerce. 2003. Top Attractions in North Carolina. http://www.nccommerce.com/tourism/top/default.asp

Table A2: Top Land and Historic Tourist Attractions in North Carolina , 2003			
Rank	Attraction	Visitors (millions)	
2	Blue Ridge Parkway	13.7	
3	North Carolina State Parks	11.3	
4	Great Smoky Mountains National Park	9.4	
6	Cape Hatteras National Seashore	2.8	
9	North Carolina Historic Sites	1.7	
11	Biltmore Estate	Not published ²³	
12	NC Museum of Natural Sciences	0.75	
13	Wright Brothers National Memorial	0.7	
14	NC Zoological Park	0.6	
15	NC Aquariums	0.6	
17	Guilford Courthouse National Military Park	0.5	
19	Chimney Rock Park	Not published	
20	Grandfather Mountain	Not published	
22	Fort Raleigh National Historic Site	0.2	

<u>Key Recommendation</u>: Protecting beautiful views and clean water and air and providing a variety of natural and historic sites to visit are vital components of efforts to grow and protect North Carolina's tourism industry.

North Carolina, like many states, is promoting heritage tourism as a means to increase tourism revenue in both rural and metropolitan areas.²⁴ Heritage tourism is travel that is motivated by a desire to experience the authentic natural, historic and cultural resources of a community or region. On average, a heritage tourist spends \$631 per trip versus \$457 per trip by the typical traveler.²⁵ Examples of recent projects to promote heritage tourism in North Carolina include:

- Cherokee Heritage Trails (www.cherokeeheritagetrails.org) This website and a book of the same name provide detailed information about places to visit within the Cherokee Reservation in western North Carolina, Tennessee and Georgia.
- Craft Heritage Trails (www.handmadeinamerica.org/tourism/) Eight scenic back road tours take you to craft studios, galleries, lodging, restaurants, historic and natural sites in the mountains of western North Carolina.
- Charles Kuralt Trail (www.northeast-nc.com/kuralt/) This trail helps visitors explore eleven national wildlife refuges and a national fish hatchery in northeastern North Carolina. The roads in the area are marked to direct visitors to the sites, and kiosks at each refuge provide information about trails, driving tours and native plants and wildlife.
- NC Civil War Trails (www.nccivilwar.com/ncvatrailssystem.htm) Eight driving tours take visitors to Civil War-era sites and museums throughout the state.
- Roanoke River Paddle Trail (www.roanokeriverpartners.org) This canoe trail, which now has eleven camping platforms, was constructed by the nonprofit Roanoke River Partners to increase appreciation of the Roanoke River and provide tourism infrastructure for small businesses in communities along the Roanoke River and Albemarle Sound.

²³ NC Division of Tourism does not publish attendance figures for private attractions.

²⁴ NC Department of Commerce web site, http://www.nccommerce.com/tourism/heritage/

²⁵ Travel Industry Association of America. 2001. Report on Cultural and Historic Tourism.

- Sandhills Agriculture (www.sandhillsagriculture.com) This website funded by the Golden Leaf Foundation advertises farm stands, farm markets and other attractions in Anson, Montgomery, Moore and Richmond counties.
- Yadkin-Pee Dee Lakes Project (www.lakesproject.org) The goal of this project is to promote the seven counties along the Yadkin and Pee Dee rivers and the Uwharrie National Forest as North Carolina's "Central Park" a rural hub for outdoor recreation and tourism near the state's three largest metropolitan areas.

One of the economic advantages of building a strong, widespread heritage tourism industry in North Carolina is that the natural and historic resources on which it is based cannot move elsewhere. Grandfather Mountain, Cape Hatteras and the Biltmore Estate are here to stay. These three sites are great examples of what can be done to protect important places and build a vibrant tourism industry around them. The sites are special, accessible and welcoming, and the communities in which they are based provide hotels, restaurants and stores so that visitors have places to stay and a variety of other activities to enjoy when they visit.

North Carolina has many extraordinary sites across the state that can provide important economic benefits to their communities if they are protected, made accessible and needed amenities are provided to help visitors enjoy their stay. Lynn Minges, Executive Director of the NC Division of Tourism, Film and Sports Development says "[h]eritage tourism is a viable economic tool particularly for our more rural areas. Often, our smaller communities can have great success in attracting visitors who bring important revenue to their local economies when the community identifies, develops and markets their unique heritage and cultural resources."²⁶ Enhancing North Carolina's programs to help communities protect and provide access to their natural and historic assests would be a great investment in North Carolina's economic future and quality of life.

Forest Products

<u>Key Finding</u>: Forest products, such as lumber, pine straw, pulp and paper, generate \$3.7 billion of North Carolina's gross state product. However, forest acreage decreased by one million acres between 1990 and 2001, primarily because forests have been developed around urban areas.

North Carolina's vast forestland has long been recognized for its economic significance. In 1622, John Pory from Virginia predicted that, when the pines of the North Carolina region were tapped, England would no longer have to depend on the Scandinavian countries for naval stores – tar, pitch and turpentine. By 1768, 60% of the naval stores exported from the colonies were from North Carolina.²⁷

North Carolina has the ninth largest forest product industry in the country based on forest-related earnings.²⁸ In 2002, 52,000 North Carolina workers harvested and produced forest products such as lumber, pine straw and pulp and paper worth \$3.7 billion in gross state product.²⁹

North Carolina is still predominantly a state of forests; timberland (or "working forests") accounts for 17.7 million acres (57%) of the state's land.³⁰ However, forest acreage has fallen by one million acres (5.6%) since

²⁶ NC Division of Tourism, Film and Sports Development Press Release. July 02, 2003. http://www.commerce.state.nc.us/publicaffairs/releases/07022003_Heritage.htm

²⁷ Powell, William S. 1989. North Carolina through Four Centuries. The University of North Carolina Press. p. 135.

²⁸ American Forest and Paper Association. 2001. US forest facts and figures. Chapter 14: Products and production. www.afandpa.org. Ranking is based on 1998 data.

²⁹ US Bureau of Economic Analysis. 2002. Gross state product of North Carolina. These figures include gross state product from the following industries: 1) forestry, fishing and related activities, 2) wood product manufacturing and 3) paper manufacturing. www.bea.doc.gov.

³⁰ Brown, Mark J. 2002. Forest statistics for North Carolina. USDA Forest Service, Southern Research Station, Resource Bulletin, SRS-88. p. 1. This report, which is conducted approximately every ten years since 1938, defines timberland as "forest land capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization" (e.g., parks and wilderness areas). p. 11.

1990, primarily because forests have been developed around urban areas.³¹ The US Forest Service and the NC Division of Forest Resources had been predicting a loss of forest land in the next forty years, but this conversion was much more rapid than projected.³²

The vast majority (78%) of North Carolina's forests are owned by private individuals, families and non-timber companies.³³ An additional 8% of the state's timberland is owned by industrial forest companies such as International Paper and Weyerhaeuser. The remaining timberland is in public ownership, much of it in the state's four national forests, its military bases and on state game lands managed by the NC Wildlife Resources Commission.



The loss of North Carolina timberland is happening for two reasons. First, in the 1990s, forest acreage held by private landowners declined by 700,000, primarily because forestland was developed around urban areas. Second, industrial timber companies, such as International Paper and Weyerhaeuser, sold 33% of their timberland, and they now own only 1.5 million acres. The growing stock, particularly in hardwood trees, on the industry's remaining lands also decreased in the 1990s.³⁴

More than 90% of the timber industry's remaining acreage is in the coastal plain, and many of these tracts are now on the market.³⁵ This large-scale change in ownership is a concern because subdivision of the land will make forest management more expensive, and it will also expose rare and vulnerable natural habitats to potential development. The State of North Carolina is working with nonprofit conservation groups to protect some of these tracts that have rare ecosystems or are adjacent to other public lands. However, limited funds are hampering the effort to acquire land quickly enough to meet the timber industry's time frame.

³¹ Ibid. p. 1.

³² McDow, Will. 2004. North Carolina forests at a crossroads: selected results of the 2002 forest statistics of North Carolina. Environmental Defense, Raleigh, NC. www.environmentaldefense.org/go/NCforestrystats. McDow compares the results of the US Forest Service 2002 forest statistics cited above with predictions in Wear, David N. and John G. Greis. 2002. Southern Forest Resource Assessment, US Forest Service Technical Report GTR SRS-53.

³³ Ibid. p. 1.

³⁴ Brown, Mark J. 2002. Forest statistics for North Carolina. USDA Forest Service, Southern Research Station, Resource Bulletin, SRS-88. p. 71-2.

³⁵ Martin, Edward. April 2004. Wood that they could: thinning their holdings, timber companies clear the way for Wall Street to find a slow-growth stock. Business North Carolina.

<u>Key Recommendation</u>: A sustainable forest products industry depends on maintaining land on which to grow trees.

A sustainable timber industry depends on maintaining land on which to grow trees. In addition, large blocks of forest, unfragmented by houses or major roads, make management and harvesting more practical and economical. North Carolina ranks among the top five states for the number of homes bordering forest land.³⁶ Adjacent homes increase the risk of death and major property losses from wildfires. Controlled burns, an important management technique, can also become difficult when homes are too close or if smoke might reduce visibility on a highway.

Where should North Carolina focus its efforts to conserve timber land? The NC Division of Forest Resources and the Department of Forestry, NC State University identified eight "Forest Legacy" areas as high priorities for conservation. These areas have an active timber industry; contain large blocks of contiguous forest; are threatened by conversion to non-forest uses; and provide other important forest benefits such as habitat for rare species, scenic and cultural resources and opportunities for public recreation (Map 3).³⁷

Purchase of development rights (PDR) programs allow forest owners to be compensated for a voluntary agreement to restrict permanently future non-forest development on the land. A restriction is placed in the deed of the land. Forest owners are compensated for their development rights so that they do not lose equity in their land. Because the development rights have been removed from the land, which remains in private hands and may still be sold or passed along to heirs, the land is valued at a price that reflects its forest value, rather than its development value.

Military Bases

Key Finding: North Carolina's four major military bases generate approximately \$12 billion of our gross state product. One of the biggest problems facing our military bases is development on once rural land surrounding their borders which makes training soldiers difficult and dangerous. The US Department of Defense used such development and states' efforts to prevent it as one of the key factors in its decisions about which bases to close in the near future.

North Carolina's first military base was founded in 1918, when 127,000 acres of desolate sand hills and pine trees were designated as a US Army installation. Adequate water, rail facilities and the Carolina climate lent themselves to Army needs, and Camp Bragg emerged as a field artillery site on August 21, 1918. It was named in honor of Confederate General Braxton Bragg, a former artillery officer and North Carolinian.

Congress decided in February 1922 that all artillery sites east of the Mississippi River would become permanent Army posts. The camp was redesignated as Fort Bragg, September 30, 1922. Today Fort Bragg and neighboring Pope Air Force Base form one of the largest military complexes in the world.³⁸

Since that time, military operations in North Carolina have expanded, and North Carolina is now home to four major military bases:

- Fort Bragg Army Base and Pope Air Force Base in Cumberland County
- Camp Lejeune Marine Corps Base and New River Air Station in Onslow County
- Cherry Point Marine Corps Air Station in Craven County
- Seymour Johnson Air Force Base in Wayne County

³⁶ NC Division of Forest Resources. 2004. Forestry Summit Report: Sustaining Working Forests. p. 4.

 ³⁷ Blank, Gary. 1999. Conserving North Carolina's Forests: Assessment of the Need for the Forest Legacy Program. NC Division of Forest Resources.
 ³⁸ http://www.bragg.army.mil/history/Default.htm

Approximately \$12 billion of North Carolina's gross state product is generated by our military bases. These four bases provide over 333,000 jobs for North Carolinians, with 262,000 of these jobs directly related to military operations and an additional 68,000 government contract jobs.³⁹ In addition, the bases stimulate an additional 84,000 jobs from economic activity associated with military spending.⁴⁰ The impact of the military is felt in every county in the state, and the impact is understandably magnified in the southeastern part of the state where the four military bases are located.

Military bases need large areas so that soldiers can simulate what they will encounter on a battlefield. Soldiers must fly planes, drop bombs, parachute, shoot rifles and navigate through woods and swamps by day and night. The military has traditionally managed risk and noise associated with training by conducting these activities as far from civilians as possible.

One of the problems facing military bases all over the United States is development of houses and businesses on once rural land surrounding their borders. New neighbors often complain about aircraft noise and ammunition, making it difficult for the military to train and upgrade to more powerful and louder planes and other equipment. The Navy's proposal to locate an "outlying landing field" for new F/A-18 Super Hornets in North Carolina rather than Oceana Naval Air Station in Virginia Beach was motivated by an interest in moving flights away from the suburbs now surrounding Oceana.⁴¹

North Carolina's military bases are facing these problems also. Fort Bragg, for example, had to stop using a particular drop zone for paratrooper practice after a large apartment building was built nearby.⁴² The NC Advisory Commission on Military Affairs, co-chaired by General Hugh Shelton (retired) and Troy Pate, found that "encroachment into high noise and accident potential zones was singled out as the most critical issue facing our military bases. As such, it threatens the long-term viability of our bases at a time when their continued presence in our State is vital for both national defense and economic development."⁴³

<u>Key Recommendation</u>: To ensure the continued presence of our four military bases we must prevent urban encroachment around the bases and their training grounds.

Closure of any of North Carolina's bases would be an economic blow to the entire state. One of the best ways to ensure their continued value to the military is to prevent urban encroachment around them.

Fortunately, preventing urban encroachment does not mean that neighboring land can no longer provide important benefits for North Carolinians. Farms and woodlands are good neighbors of military bases as are natural environments managed primarily for native plants, wildlife and water quality with occasional recreational and hunting use. In fact, some of the state's most outstanding natural areas are found at Camp Lejeune and Fort Bragg.

The NC Department of Environment and Natural Resources has developed a list of priority areas for protection near the four largest military bases – these areas total 19,500 acres.

³⁹ Brockett, S. Richard, Adam Cooper, Dana J. Gauland, and Erin Francisco. 2004. North Carolina Statewide Military Impact Study. Prepared for the NC Advisory Commission on Military Affairs by East Carolina University Regional Development Services and Regional Economic Models, Inc. in cooperation with NCSU Economic Development Partnership. www.ecu/edu/rds/ The Brockett study analyzes the impact of all military bases, DoD contracts, and military and veteran retiree benefits on North Carolina's economy. Because our focus is on the economic impact of undeveloped land, we have reported only the impact of the four largest military bases rather than the total impact of military operations across the state.

⁴¹ Price, Jay. Battle crosses state lines. Washington County airfield would help Virginia Beach's noise problem. March 15, 2004. The News and Observer. ⁴² Ibid.

⁴³ Pate, Troy. Letter to Governor Michael Easley. March 25, 2003. As found in the SWOT Analysis (Strengths/Weaknesses/Opportunities/Threats). Report for the NC Advisory Commission on Military Affairs. May 2003 by John A. Berndt

Fishing, Hunting and Wildlife-Watching

<u>Key Finding</u>: Fishing, hunting and wildlife-watching are important economic drivers in North Carolina. Recreational anglers, hunters and wildlife-watchers spend \$2.8 billion per year, and commercial fishing adds \$103 million in nineteen coastal counties.

As North Carolina awoke from its Rip Van Winkle period in the mid-1800s, fishing was one of the most important industries. Shad and herring fisheries along the Roanoke and Pamlico rivers were busy and thriving sites. The fish were salted down or smoked, packed in hogsheads and shipped out.⁴⁴

Fishing, hunting and watching wildlife are still important to North Carolinians – both economically and to our quality of life. Below is a summary of the economic impacts of these activities. More information about their impact on quality of life is included in Appendix C.

Thirty-nine percent of North Carolinians participate in wildlife-associated recreation: hunting, fishing or wildlife-watching (which is defined as activities with a primary purpose of observing, feeding or photographing wildlife or fish). Thirty-two percent watch wildlife, and 17%, including many who also watch wildlife, are sportsmen.

In addition, many visitors to North Carolina also participate in these activities, bringing tourist dollars to fuel North Carolina's economy. Sixteen percent of anglers who traveled out of state to fish in coastal waters came to North Carolina in 2002 and 2003.⁴⁵ Total expenditures on these activities by residents and non-residents were \$2.8 billion in 2001 (Table A3).⁴⁶

Table A3: Expenditures and % of Days Spent on Activity by Non-Residents in 2001			
Activity	Total Expenditures	% Non-Residents	
Wildlife Watching	\$1.179 billion		
Fishing	\$1.076 billion	12%	
Hunting	\$556 million	2%	
Total	\$2.811 billion		

Commercial fishing is an important economic activity in nineteen coastal counties. In 2002, its economic impact was \$103 million. Recently, the most economically important commercial species were hard blue crabs, shrimp and southern flounder.⁴⁸ In 2003, North Carolina accounted for 24% of the hard blue crab catch in the nation, and 68% of the pounds of all fin- and shellfish caught commercially in the South Atlantic (North Carolina, South Carolina, Georgia and the east coast of Florida).⁴⁹

⁴⁴Powell, William S. 1989. North Carolina through Four Centuries. The University of North Carolina Press. p. 309.

⁴⁵ National Marine Fisheries Service. 2004. Fisheries of the United States 2003. "US Marine Recreational Fisheries: US Recreational Number of Anglers and Trips by States, 2002 and 2003." P. 49.

⁴⁶ US Fish and Wildlife Service. 2002. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. State Overview. Preliminary Findings. ⁴⁷ Ibid. p. 27. The survey asked respondents about wildlife-watching at their homes and other places besides their homes. This figure represents the

percent of survey respondents who watch wildlife in North Carolina at places other than their homes who are not North Carolina residents. ⁴⁸ Burgess, Christine C. and Alan J. Bianchi. 2004. An Economic Profile Analysis of the Commercial Fishing Industry of North Carolina Including

Profiles for State-Managed Species. NC Division of Marine Fisheries, NC Department of Environment and Natural Resources. Morehead City, NC. ⁴⁹ National Marine Fisheries Service. 2004. Fisheries of the United States 2003. "US Commercial Landings: US Domestic Landings, By Region and By State, 2002 and 2003." P. 6.

North Carolina has a "competitive advantage" over many states in its potential to build a larger, more profitable economy based on wildlife-watching, fishing and hunting. We have the eighth largest number of bird species in the country. Overall, the diversity of our native plants, fish and wildlife has led international scientists to declare four of our five ecoregions among the most significant in the world (See Appendix D for more information). With 2.9 million acres of water, North Carolina has the largest estuarine system on the Atlantic coast.

However, the state's water quality problems and the rapid development of farms and forest are a threat to North Carolina's capacity to grow its wildlife, fishing and hunting industry.

- Water quality problems are reducing the abundance of fish in North Carolina. For example, the NC Division of Marine Fisheries has listed more than fifteen species of coastal and estuarine fish and shellfish as threatened, including Southern Flounder, River Herring, American Shad, Eastern Oyster and Blue Crab.⁵⁰ More than 2,600 miles of streams in North Carolina are not meeting water quality standards (see Appendix B for more information).
- Populations of Northern Bobwhite Quail, a popular game species, have fallen by 73% nationwide since 1966 because changes in farming practices dramatically reduced the type of "early-successional" habitat they depend on.⁵¹ Many species of songbirds, such as the prairie warbler, are also dependent on this type of habitat. (The NC Wildlife Resources Commission is working with private landowners in three areas and on almost 4,000 acres of state game lands to improve habitat for these species through a new program called Cooperative Upland-habitat Restoration and Enhancement (CURE)).
- Eighteen percent of the state's native plants and wildlife are vulnerable to extinction because of development of the lands on which they depend (see Appendix D for more information).

Key Recommendation: The viability and potential for growth of wildlife-watching, hunting and fishing depends on maintaining diverse, accessible wildlife habitats and high water quality in our rivers, estuaries and ocean. One of the best ways to address threats to water quality and loss of wildlife habitat is to protect vegetated buffers along streams and estuaries and forests and farmland that provide important habitat for wildlife.

One of the best ways to address these threats and grow the industry is to protect important wildlife and fish habitats, and to make the land accessible whenever possible. Key ways to accomplish these goals are to:

- Protect vegetated buffers along rivers, streams and coastal waters
- Use purchase of development rights (PDR) programs to protect farms and working forests. Landowners may then lease their land for hunting or wildlife-watching as a way to supplement their income (See the sections on agriculture and forest products earlier in this appendix for more information about PDR programs).
- Provide funds to allow the NC Wildlife Resources Commission and other state agencies, local governments and land trusts to purchase important natural habitats that can be opened for hunting, fishing or wildlife watching.

⁵⁰ NC Division of Marine Fisheries. 2003. Stock Status Report. http://www.ncfisheries.net/stocks/index2k3.html.

⁵¹ Helsinki, Ronald R. 2001. How Much is Enough for 2002? A Regional Wildlife Habitat Needs Assessment for the 2002 Farm Bill. Wildlife Management Institute. P 20

Appendix A

Recruiting and Retaining Knowledge Workers

Key Finding: Recent research into location decisions of high tech companies indicates that the best strategy for recruiting and retaining such companies is to build and maintain communities that appeal to high-tech or "knowledge workers." Among other things, such workers are very interested in outdoor activities and the authenticity and uniqueness that come from historic buildings, established neighborhoods and natural and rural landscapes that identify the place as being different than any other.

In an effort to bring together research and industry to benefit the entire state, the Research Triangle Park was created in 1958. The unique idea for the Park was based on a tenant recruitment plan focused specifically on "high tech" industry to supplement the state's dependence on older industries.⁵² As one of the preeminent research parks in the country, Research Triangle Park is one of the state's most valuable economic development tools because it allows North Carolina to compete on an international level for knowledge-based companies and workers.

The first of three strategic goals of the NC Department of Commerce is to "keep North Carolina competitive for high-value, technologically competitive industries and companies."⁵³ How can North Carolina be successful in meeting this goal? In the past, the focus of economic development officers has been on recruiting companies. Now recent research is leading some communities to focus on a different strategy. Instead of focusing on the companies, some economic development officers have begun focusing on building communities that will attract and retain high-tech or "knowledge workers."

Esteemed economist and management expert Peter Drucker is credited with first documenting the importance of knowledge workers in the 20th and 21st century economy. Building on those theories, Paul Romer writes that the activities of knowledge workers "will lead to the biggest gains for business and for society as a whole."⁵⁴ New research by Richard Florida and colleagues at Carnegie Mellon reveals that if a community can keep a pool of trained knowledge workers, companies will choose to locate there, and some workers will even start new firms to generate more employment.

"Access to talented and creative people is to modern business what access to coal and iron ore was to steelmaking. It determines where companies will choose to locate and grow, and this in turn changes the ways cities must compete....Creative people, in turn, don't just cluster where the jobs are. They cluster in places that are centers of creativity and also where they like to live." ⁵⁵

Florida is not alone in his ideas about attracting workers, not just companies. Harvard economist Edward Glaeser has written about Boston's ability to re-invent itself and maintain a strong economy despite downturns in its traditional manufacturing industries. Boston was able to regain strength by becoming a hub for the information economy, and Glaeser credits four reasons for that success. One of these reasons was Boston's "ability to attract residents, not just firms."⁵⁶

⁵² Powell, William S. 1989. North Carolina through Four Centuries. The University of North Carolina Press. p. 530-531.

⁵³ http://www.ncccommerce.com/categories/aboutus.htm

 $^{^{\}rm 54}$ Romer, Paul. Beyond the knowledge worker. January/February 1995. Worldlink.

⁵⁵ Florida, Richard. 2002. The Rise of the Creative Class and how it's transforming work, leisure, community and everyday life. Basic Books. P. 6-7.

⁵⁶ Glaeser, Edward. September 2003. Reinventing Boston: 1640-2003. Harvard Institute of Economic Research Discussion Paper Number 2017.

Pg 7. http://post.economics.harvard.edu/hier/2003papers/HIER2017.pdf

What are knowledge workers looking for in a place to live? They are looking for places with:

- many opportunities for creative work in their fields,
- a diverse and creative lifestyle including music and art, technology and **outdoor activities**,
- places to meet people like themselves but also a diversity of other types of people,
- authenticity and uniqueness which comes from **historic buildings**, established neighborhoods, natural and rural landscapes that identify the place as being different than any other.⁵⁷

Key Recommendation: To recruit and retain knowledge workers, we must protect key natural areas, historic properties and rural landscapes and provide trails, parks and other amenities for outdoor activities.

"My focus groups and interviews with Creative Class⁵⁸ people reveal that they value active outdoor recreation very highly...The Creative Class people in my studies are into a variety of active sports, from traditional ones like bicycling, jogging and kayaking to newer, more extreme ones like trail running and snowboarding."⁵⁹

Investments in the kinds of amenities that appeal to knowledge workers benefit others in the population as well. Urban parks, bike lanes, greenways and trails for walking will last for generations.⁶⁰

Across North Carolina, people are starting to think about and use this strategy.⁶¹ In fact, NC Secretary of Commerce Jim Fain says that "fostering attractive communities prepared for economic development success" is one of the cornerstones of North Carolina's economic development strategy.⁶² Increased investment in land protection will be one important way to foster attractive communities that appeal to all citizens, including knowledge workers.

Economic Impact of Restoration and Reuse of Historic Buildings

<u>Key Finding</u>: Restoration and reuse of historic buildings provide important economic benefits beyond being a draw for tourists and knowledge workers. Jobs, tax revenue, and additional income and investments are created through the process of restoration.

Previous sections of this appendix have mentioned the importance of historic buildings, landscapes and communities to tourism and the recruitment of knowledge workers. Appendix B discusses how continued use of historic public buildings such as schools in established, walkable neighborhoods can help children and adults be more active and healthy in their daily lives. Appendix C discusses the high value that North Carolinians place on the opportunity to visit historic sites.

⁵⁷ Florida, Richard. 2002. The Rise of the Creative Class and How It's Transforming Work, Leisure, Community and Everyday Life. Basic Books. p. 223-231.

⁵⁸ Ibid. p. 8 and 327-329. Florida defines "creative class" as people involved in the following occupations: computers; mathematics; architecture; engineering; life, physical, and social sciences; education; training; libraries; arts, design, entertainment, sports, and media; management; business and financial; legal; healthcare; high-end sales and sales management. He estimates that 38 million Americans, 30% of all employed people, belong to this new class.

⁵⁹ Ibid. p. 173.

⁶⁰ Ibid. p. 293-4.

⁶¹ Recent examples of interest in Richard Florida's research in North Carolina includes his 2003 lecture at the NC Museum of Art, mention of his research at the 2004 Governor's Conference on Tourism, and the mention of his work by Jim Goodmon, 2004 Tar Heel of the Year . (January 1, 2004, The News & Observer, Raleigh).

⁶² North Carolina: The state of minds. 20 January 2003. Fortune Special Section on US Regions.

Restoration and reuse of historic buildings can have economic impacts beyond those detailed above. In a study of the economic impact of historic preservation in North Carolina, Donovan Rypkema looked at 529 restoration projects that qualified for a federal tax credit for historic preservation.⁶³ These projects represented \$467 million in private investments. They also created 7,134 jobs, added \$139 million of additional household income and generated \$51 million in income taxes paid by construction workers and business income taxes of nearly \$15 million. And these are the direct benefits, without accounting for the indirect economic impact of those dollars as they are spent by construction workers and others involved in the projects.

⁶³ Rypkema, Donavan D. 1997. The Impact of Historic Preservation on the North Carolina Economy. Preservation North Carolina. p. 7.

Appendix B: Protecting Public Health

Clean water to drink, clean air to breathe and opportunities for physical activity and exercise are the most basic requirements for everyone's health, adults and children alike. Natural and rural land helps ensure that these necessities are available to everyone. Protecting wetlands and floodplains can also prevent loss of life and property from flooding.

Clean Water

Key Finding: More than 2,600 miles of the streams in North Carolina do not meet water quality standards. An additional 25,260 miles have not been monitored enough to assess water quality.

In 1995, when photos of dead fish floating in the Neuse River hit the national news, many North Carolinians became aware for the first time how extreme and widespread our water quality problems had become. Although the state has undertaken some important initiatives to improve water quality since then, more work is needed to protect North Carolina's streams and rivers.

The NC Division of Water Quality (DWQ) classifies all streams and rivers by how people use them. Are they used for drinking water? Do people swim in them? Do they have vibrant, healthy populations of fish, mussels and other aquatic life? DWQ then attempts to monitor the water chemistry and aquatic life at regular locations along each stream to ensure that the water is clean enough to meet its intended use.

Almost 70% of our streams are not monitored enough to assess water quality (Figure B2), but of those streams that are, 2,649 miles (24%) do not meet water quality standards (Figure B1).¹ If water quality in the unmonitored streams and rivers is similar to that found in the monitored streams, it is possible that up to



¹NC Division of Water Quality. NC Water Quality Assessment and Impaired Waters List (2004 Integrated 305(b) and 303(d) Report), Public Review Draft. April 27, 2004. Table 3-8, p. 44. In the graph in this report, categories 1 and 2 are classified as attaining quality standards; category 3 is represented as insufficient data; categories 4-6 are classified as impaired water.





B2

8,710 miles (24%) of our streams and rivers may be so polluted that they cannot be used for their intended purpose, be it drinking, swimming or habitat for fish and other aquatic life.

Why is the water in our rivers and streams degraded? Of the miles of streams that are known to be impaired, by far the largest sources of pollution are sediment and nutrients, like nitrogen, running off lawns, pavement and through storm sewers in urban areas and off crop and pasture land in rural areas (Figure B3).² When streams are stripped of the buffer of vegetation along their banks, rain washes soil, debris and pollutants into the water, making it unhealthy for human use. Fish and other aquatic life are smothered and poisoned.

<u>**Key Recommendations:**</u> Maintaining buffers of trees and other vegetation along streams is one of the most effective ways to keep polluted runoff from fields, lawns and roads from contaminating our water. It is also important to protect wetlands from development because they help purify water.

Because of the seriousness of North Carolina's water quality problems, the state has mandated that a 50-foot width of vegetated buffer be maintained where it already exists in several of the state's river basins.³ Wetlands are regulated by the US Corps of Engineers and the NC Division of Water Quality.

The vegetated buffer areas are important to slow water flow and trap and absorb sediment and nutrients before they reach the stream. The reduced water velocity also means that the stream banks are less likely to erode away.

Retaining a buffer of trees and shrubs along streams and rivers keeps pollution from reaching the water and therefore reduces the cost of water treatment. For example, in 1999 the city of Gastonia, North Carolina authorized revenue bonds in order to buy a tract of land 1,000 feet upstream from a Mountain Island Lake intake. By protecting such a key watershed, Gastonia was able to save up to \$250,000 annually in water-treatment costs.⁴

The NC Clean Water Management Trust Fund (CWMTF), a state agency which provides funding to protect stream buffers, uses DWQ's information about impaired streams, pristine waters and drinking water sources⁵ to set priorities for spending their limited dollars (Map 1). Between 1997 and 2003, the CWMTF has funded protection of 2,908 miles of river banks, 8% of the total in the state.⁶

Although this is an impressive accomplishment in seven years, thousands of miles of streams and river banks remain unprotected.

In addition to maintaining buffers along our streams and rivers, it is also important to water quality that we protect wetlands from draining and ditching. Wetlands are "areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year."⁷ Like buffers along streams, wetlands naturally remove pollutants and sediment from stormwater, and they retain large amounts of rainwater, reducing the impacts of floods downstream.⁸

² Ibid. Table 3-10. p. 46. Major sources of impairment of freshwater streams and shorelines.

³ The buffers are mandated on all streams in the Neuse and Tar-Pamlico river basins and on the main stem and lake shore lines of the Catawba River below Lake James to the South Carolina border. Rules are published in 15A NCAC 2B.0233 (Neuse), .0243 (Catawba) and .0259 (Tar-Pamlico). ⁴Trust for Public Land, "2000 Watershed Report: Building Green Infrastructure," *Mountain Island Lake: Safeguarding a Pristine Reservoir*, 1999.

⁵ For information about the NC Division of Water Quality's surface water classifications see http://h20.enr.state.nc.us/csu/swc.html

⁶River bank mileage is calculated as twice the stream mileage as streams have two banks.

⁷ Environmental Protection Agency. What Are Wetlands? www.epa.gov

⁸ Environmental Protection Agency. Wetlands and People. www.epa.gov

In the mid 1970s, 5 million acres (15%) of North Carolina were wetlands, but 1.2 million of those acres were drained, ditched or otherwise destroyed by the mid-1980s, the highest acreage loss in the entire Southeast.⁹ Wetland loss slowed after the 1980s because of stronger protection programs,¹⁰ but efforts to continue protecting and restoring degraded wetlands are critical to North Carolina's environment, water quality and reducing loss of life and property from flooding.

Clean Air

<u>Key Finding</u>: North Carolina's air quality has been steadily degrading. The federal government has ordered 32 counties to reduce levels of the pollutant ozone. Three of these counties have higher concentrations of small particulate matter (PM 2.5) in the air than national standards consider safe.

North Carolina's air quality grew much worse in the 1990s and 2000s (Figure B4),¹¹ endangering human health particularly in young children who are active outside; construction workers, runners and others who work and exercise outdoors; and those with asthma and other respiratory diseases.¹² In 2003, North Carolina had the 13th worst air pollution in the country, measured by the number of days that our citizens breathe air that does not meet federal air quality standards.¹³



⁹ Hefner, J.M. et al. Southeast Wetlands: Status and Trends, Mid-1970s to Mid-1980s. A 1994 Cooperative Publication by the US Fish and Wildlife Service and the US Environmental Protection Agency, Region IV. http://wetlands.fws.gov/Pubs_Reports/Sewet/

¹⁰ Dahl, Thomas E. 2000. Status and Trends of Wetlands in the Conterminous United States 1986 to 1997. US Fish and Wildlife Services, Washington, DC.

¹¹ Data derived from NC Division of Air Quality "Ozone Design Value Maps" http://daq.state.nc.us/monitor/data/o3design/

¹² Environmental Protection Agency. Smog – who does it hurt? What you need to know about ozone and your health. www.epa.gov/airnow/health/ smog1.html

¹³ Environmental Defense. Scorecard: The pollution information site. www.scorecard.env-releases/cap/rank-states-risk.tcl The information on this site is derived from the US Environmental Protection Agency Air Quality System database and the National Emission Trend database.

In North Carolina's Piedmont, hot days and nights with little wind trap pollutants from cars and let them build to dangerously high levels in the summer. In our mountains, rugged peaks capture pollutants wafting from power plants in North Carolina and thirteen other states.

Because we cannot control North Carolina's weather or topography, the primary solution to North Carolina's air quality problems must be to reduce the amount of pollutants released into the air, particularly from motor vehicles and power plants. North Carolina has taken first steps toward this goal. In 2002, the NC Legislature passed the Clean Smokestacks Act, which requires that power plants reduce their emissions by 75% over the next five to ten years. In 2004, state and local governments in 32 counties were developing plans for reducing ground-level ozone (smog) and PM 2.5 (very small particulates suspended in the air) under order of the US Environmental Protection Agency.¹⁴

Key Recommendation: A secondary, but very important, strategy to reduce ozone and particulate matter in the air is to maintain and replant trees in areas with poor air quality. American Forests recommends that urbanizing areas in the Southeast maintain at least 40% tree cover, ranging from 15% in central business districts to 50% or more in suburban residential areas.

A secondary strategy that some local governments here and in other states are using to help improve air quality is to increase the amount of tree cover in polluted areas. Trees and other vegetation help improve air quality by:¹⁵

- reducing levels of carbon dioxide and nitrogen oxide (CO² and NOx), pollutants that cause ground-level ozone. Trees and other vegetation use the nitrogen and carbon in these gases to grow.
- providing shade to lower temperatures in urban areas. The gases that are the components of ground-level ozone react together more readily when temperatures are high.
- reducing the reliance on use of air conditioning.
- capturing air-borne particulates on their leaves.

In 1991, American Forests measured tree cover in 440 communities and found that tree canopy covered more than 60% of the town in most established communities in the southeastern United States. Ten years later they discovered that forest cover had decreased in 40 communities by an average of 21% because of sprawling development patterns.¹⁶ They recommend that towns and cities aim for an average tree cover of at least 40% -- with a minimum of 15% tree cover in central business districts, 25% in urban residential areas and 50% in suburban residential areas – because of the important environmental benefits that trees provide.¹⁷

In addition to planting and maintaining trees on streets and building lots, communities can help reduce air pollutants by conserving natural forests within city limits. These areas can have a greater impact on air quality than their size might indicate because of the density of tree coverage. A study in Boulder, Colorado, for example, found that although its natural forests along streams represent only six percent of the city's acreage, they provide 13% of the city's forest canopy cover and remove 13% of the pounds of air pollutants removed each year by trees.¹⁸

¹⁴ http://www.epa.gov; http://daq.state.nc.us/

¹⁵ City of Boulder Water Conservation Office. 2002. Calculating the Value of Boulder's Urban Forest. Chapter Four: Air Quality, Pollution, and Trees. http://bcn.boulder.co.us/basin/boulder/urbanforest/

¹⁶ American Forests. 2003. New study reveals dramatic national tree loss. www.americanforests.org/news/display.php?id=120

¹⁷ American Forests. Setting urban tree canopy goals. www.americanforests.org/resources/urbanforests/treedeficit.php

¹⁸ City of Boulder Water Conservation Office. 2002. Calculating the Value of Boulder's Urban Forest. Chapter Four: Air Quality, Pollution, and Trees. http://bcn.boulder.co.us/basin/boulder/urbanforest/

Several local governments in North Carolina are using urban reforestation and land conservation to help reduce air pollution. The Fayetteville area is trying a variety of strategies including expanded land acquisition in watershed areas, planting additional trees, inventorying green space and investigating a "conservation subdivision option" to protect natural land as part of the development process.¹⁹ The Centralina Council of Governments, which represents nine counties in the Charlotte area, encourages planning and projects to protect trees for air quality and other environmental benefits.²⁰

Places to Exercise

Key Finding: Physical inactivity and poor diet combined have become the second-leading cause of preventable death in North Carolina. Medical costs associated with obesity now total \$2.1 billion per year. Public health officials recognize that the design of modern neighborhoods, which makes walking and biking difficult and dangerous, is a significant contributor to this epidemic.

Obesity, caused by physical inactivity and poor diet, has become the second-leading cause of preventable death in North Carolina, causing 10,000 premature deaths in 2000 alone.²¹ Between 1992 and 2002, the percent of obese North Carolinians grew from 13.4% to 22.5% of the population (Figure B5).²²



¹⁹ Planning Today for Clean Air Tomorrow: Bi-Annual Progress Report of the Early Action Compact in the Fayetteville Metropolitan Statistical Area, North Carolina. An agreement of partnership by USEPA Region 4, North Carolina Department of Environment and Natural Resources, and the Cumberland County Commissioners. December 31, 2003. Available at www.epa.gov

²⁰ Tree Planting Standards. Sustainable Environment for Quality of Life program of the Centralina Council of Governments. http://www.centralina. org/seql/actionitems/treestandards/index.htm

²¹ NC Division of Public Health, Physical Activity and Nutrition Unit. Blueprint for changing policies and environments in support of increased physical activity. www.EatSmartMoveMoreNC.com

²² Center for Disease Control and Prevention, Behavioral Risk Surveillance System. Trends Data: North Carolina, Obesity: By Body Mass Index, 1990-2002. www.cdc.gov/nchs/fastats/map-page.htm

Eighty-two percent of North Carolinians do not get the recommended amount of exercise.²³ Physical inactivity contributes strongly to heart disease, stroke, diabetes, asthma, some types of cancer and complications of pregnancy, and it is a central factor behind the alarming increase in overweight and obesity²⁴ all across America. Medical treatment of obesity and health problems caused by it now cost \$2.1 billion per year in North Carolina and \$75 billion across the United States.²⁵

This dramatic loss of health and life led the Surgeon General to declare obesity a national "epidemic," ²⁶ and public health practitioners are searching for ways to combat it.

Why are North Carolinians so inactive and increasingly overweight? Public health scientists recognize three major causes: 1) we are consuming more calories, 2) we have less active lifestyles because of sedentary jobs and the amount of time we spend traveling in cars and 3) the design of modern neighborhoods makes walking and biking difficult and dangerous.²⁷ Figure B6 illustrates the dramatic changes over the last 20 years in the average amount of time that Americans spend walking and driving in a car.²⁸

<u>Key Recommendation</u>: More parks, greenways and trails are needed to provide convenient opportunities for physical activity. Restoration and reuse of public buildings such as schools in established, walkable neighborhoods can also encourage physical activity among children and adults.



²³ Behavioral Risk Factor Surveillance System, State Center for Health Statistics, NC-DHHS, 2000 as reported in Blueprint for changing policies and environments in support of increased physical activity. www.EatSmartMoveMoreNC.com

²⁴The National Institute of Health (NIH) defines overweight as a body mass index of greater than 25 and obesity as a BMI greater than 30.

²⁵ Finkelstein, Eric A. et al. State-level estimates of annual medical expenditures attributable to obesity. January 2004. Obesity Research. North American Association for the Study of Obesity.

²⁶ US Department of Health and Human Services. 2001. The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity. pp. 1,2.

²⁷ National Institute of Environmental Health Sciences. Obesity and the Environment. and Center for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Nutrition and Physical Activity. Factors contributing to obesity: biological, behavioral, and environmental factors associated with overweight and obesity. http://www.cdc.gov/nccdphp/dnpa/obesity/contributing_factors.htm

²⁸ Active Living By Design. A primer on active living by design. P.4. www.activelivingbydesign.org

Combating inactivity will take a multi-faceted approach, but many leading public health organizations²⁹ now strongly advocate making our communities more pedestrian- and bike-friendly and improving access for all citizens to parks, trails and greenways. Research has demonstrated that increasing access will lead more people to exercise.³⁰ One study of residents of six diverse North Carolina counties showed that access to trails and other places to exercise increased by 25% the number of people who exercise at least three times a week.³¹

North Carolina has much work to do to develop a system of parks, trails and other safe and pleasant walking routes close to most people's homes. One measure of the need is a statewide poll which revealed that, on average, the nearest trail that those surveyed knew about was more than 20 miles from their homes – clearly more than can be conveniently driven for regular exercise.³²

A task force of national experts on urban parks recommends that residents be able to walk to a park or greenway within 10 minutes in dense urban areas or bike within 10 minutes in spread-out sections of cities and towns.³³ Denver has shown that reaching such a goal in a modern, sprawling city is possible. More than 90% of its citizens now live within six blocks of a park or natural area, and the City is working to reduce this distance to four blocks or about one-third of a mile. Denver has also rigorously defined these blocks as "walkable," meaning that "people can get to the park without crossing a highway, railroad track, or body of water."³⁴

Renovation and reuse of historic public buildings can also help people get the exercise they need when the buildings are in established neighborhoods with sidewalks and safe, short walking distances to homes, shopping and work. For example, many older schools are surrounded by existing neighborhoods with good sidewalks so that it is safe for children to walk and bike to school. Such accessibility not only reduces busing costs, it also helps children be active.

²⁹ The Center for Disease Control, the Surgeon General office, the National Institute for Environmental Health Sciences, the NC Division of Public Health - Physical Activity and Nutrition Unit, and Active Living by Design at UNC-Chapel Hill are among the most prominent.

³⁰ Center for Disease Control. Effective Population-Level Strategies to Promote Physical Activity from the Guide to Community Preventive Services. www.cdc.gov/nccdphp/dnpa/physical/recommendations.html

³¹ Huston, Sara L. et al. 2003. Neighborhood environment, access to places for activity, and leisure-time physical activity in a diverse North Carolina population. American Journal of Health Promotion. Vol. 18, No. 1. p. 58-69. The counties surveyed were Cabarrus, Henderson, Pitt, Robeson, Surry and Wake.

³² Moore, Roger L. et al. 1998. North Carolina Statewide Trail and Greenway Survey. Conducted by the NCSU Department of Parks, Recreation, and Tourism Management for the NC Division of Parks and Recreation.

³³ Harnik, Peter. 2003. The Excellent City Park System: What Makes It Great and How to Get There. Trust for Public Land, San Francisco, CA. p. 23. ³⁴ Ibid. p. 25.

Flood Protection

Key Finding: Hurricanes and tropical storms in the last ten years have illustrated the great cost in lives and property damage caused by flooding.

The importance of restricting development in floodplains became crystal clear in 1999 in the aftermath of hurricanes Dennis and Floyd. The combined rainfall of the two September hurricanes pummeled the coastal plain of North Carolina, and raging rivers and streams destroyed an unprecedented number of homes and businesses. Over 38,000 homes were declared eligible for \$88.3 million in rental assistance. The Small Business Administration also extended \$316.7 million in home loans to 8,851 applicants within the 66 counties that were declared disaster areas. The cost of providing temporary housing has exceeded \$48 million. Five years later, 1,272 families are still waiting for permanent residences.

<u>Key Recommendation</u>: Protection of land and vegetation in floodplains and on steep slopes is an important tool to prevent flooding of buildings and resultant loss of life.

After Hurricane Floyd, the Federal Emergency Management Agency (FEMA) set about buying damaged homes and businesses in flood prone areas to prevent them from being rebuilt and damaged again in future floods. At present, 1,888 units have been approved by FEMA for purchase at a cost of \$135.3 million. Another 2,534 units, worth \$136.1 million, are currently under State and FEMA review. Although purchasing these buildings and restricting future development in the floodplain may seem expensive in the short-term, in the long-term it will reduce property damage and save lives. In addition, replanting vegetation in a floodplain will improve water quality, improve habitat for native plants and wildlife and provide places for walking, fishing and enjoying the outdoors.

Appendix B

Appendix C: Enhancing Quality of Life through Recreation, Historic Sites and Scenic Beauty

Parks, historic sites and natural and rural lands are integral to the quality of life in North Carolina. Each year, millions of people walk, hunt, learn, picnic, camp, fish, drive, canoe and play ball in North Carolina's parks, game lands, forests and historic sites. Their lives are enriched as they experience the state's beauty and learn more about the natural world and our human history.

Every five years, North Carolina surveys citizens to learn what outdoor activities they are participating in and which they would participate in if more opportunities were available. The survey also asks citizens which of these activities should be given highest priority for public funding. The most popular activities are ones that can be enjoyed by almost everyone, at relatively low cost. These activities involve viewing, experiencing and learning about nature and history (Table C1).¹

Activity ²	Households Participating (%)	Number of Occasions/Year Each Household Participates (Avg.)
Walking for Pleasure	75	50
Driving for Pleasure	72	33
Viewing Scenery	71	31
Beach Activities	69	11
Visiting Historical Sites	62	3
Swimming (in Lakes, Rivers, Oceans)	54	8
Visiting Natural Areas	53	7
Attending Sports Events	52	9
Picnicking	52	4
Visiting Zoos	51	1
Fishing (Freshwater)	50	10
Use of Open Areas	41	8
Swimming (in Pools)	40	10
Fishing (Saltwater)	38	5
Attending Outdoor Cultural Events	35	2
Bicycling for Pleasure	32	11
Other Winter Sports	31	1
Camping (Tent or Vehicle)	29	3
Softball/Baseball	28	6
Hunting	28	6
Use of Play Equipment	28	6
Power Boating	26	6
Jogging/Running	24	14
Basketball	24	7
Nature Study	22	9
Golf	22	7

¹ Statewide Comprehensive Outdoor Recreation Plan (SCORP), p. II-17, http://www.ils.unc.edu/parkproject/resource/scorp/scorp_ch2.pdf

² Ibid. p. II-18, II-20. Includes activities within top 20 in either households participating or number of occasions per year each household participates.

Although many North Carolinians report enjoying outdoor activities, most would be interested in participating even more frequently if more opportunities were available. A recent survey found, for example, that one reason that North Carolinians do not use trails as much as they would like is that, on average, the nearest trail that they know about is more than 20 miles away from their homes.³

North Carolinians also support public funding to provide the land and facilities needed for many of these activities (Table C2).⁴

Table C2: Demand and Funding Support for Outdoor Activities			
Activity	Support for Public Funding of Additional/Improved Facilities	Interest in Participating More Often if More Opportunities/Facilities Available	
Walking for Pleasure	High	High	
Fishing (Freshwater)	High	High	
Beach Activities	High	High	
Camping (Tent or Vehicle)	High	High	
Picnicking	High	High	
Attending Outdoor Cultural Events	High	High	
Visiting Natural Areas	High	Moderate	
Visiting Historical Sites	High	Moderate	
Use of Play Equipment	High	Moderate	
Bicycling for Pleasure	Moderate	High	
Swimming (in Pools)	Moderate	High	
Hunting	Moderate	Moderate	
Viewing Scenery	Moderate	Moderate	

In North Carolina, "natural resource-based" outdoor recreation such as trail walking and hiking, viewing scenery, nature study, picnicking, camping, boating and swimming in lakes and rivers is primarily provided by the state and federal governments in state and national parks and forests. Hunting and fishing opportunities are provided on state game lands and on national forests. Ball fields, swimming pools, playgrounds, basketball courts and other active recreation sites are primarily provided by local governments and the private sector.⁵ Historic sites are maintained by all levels of government as well as by private groups.

Across the state, government agencies and nonprofit citizen groups have developed plans to provide the outdoor opportunities that North Carolinians are seeking.

³ Moore, Roger L. et al. 1998. North Carolina Statewide Trail and Greenway Survey. Conducted by the NCSU Department of Parks, Recreation, and Tourism Management for the NC Division of Parks and Recreation.

⁴ Statewide Comprehensive Outdoor Recreation Plan, p. II-25, II-26, www.ils.unc.edu/parkproject/resource/scorp/scorp_ch2.pdf

⁵ Ibid. p. II-2.

Natural-Area Recreation Such as Hiking, Camping and Swimming in Lakes and the Ocean

Key Finding: Walking for pleasure, beach activities, swimming in lakes and visiting natural areas are some of the most popular activities in North Carolina, and North Carolinians strongly support public funding to provide additional places for such activities. A record 13.2 million people visited North Carolina's state parks in 2002, a 160% increase in the last 20 years.

North Carolina has a long history of supporting state parks. In 1915, Representative Gaston P. Deyton of Yancey County introduced a bill authorizing the appointment of a commission to acquire a portion of Mount Mitchell and the creation of "a public park for the use of the people of North Carolina." Mount Mitchell became the first state park created in the country.⁶

Almost 100 years later, North Carolina has a diversity of state parks, national parks and national forests that provide opportunities for the public to walk, swim at lakes and beaches, visit natural areas, fish and camp. Visitation to these parks and forests has been rising. A record 13.2 million people visited North Carolina's state parks in 2002, a 160% increase over the last 20 years.⁷

Key Recommendation: To meet public demand for outdoor recreation, additional state parkland is needed to enlarge existing parks and to create new parks in areas of the state that do not have nearby state parks now.

Because increased public use can damage sensitive natural areas and overcrowding can reduce visitors' enjoyment, the NC Division of Parks and Recreation has been developing plans to expand the state's park system.⁸

In addition to providing places for the public to enjoy the outdoors, State Parks are also mandated⁹ to protect representative examples of North Carolina's archaeological, geological, biological, scenic and recreational resources. To meet this mandate, the NC Division of Parks and Recreation undertook an analysis of the natural resources in the state to determine which are not adequately represented in the state parks system. They identified 108 themes that represent the natural diversity of North Carolina, such as mountain bogs, brownwater floodplains and longleaf pine savannas. Only 29 of these themes are adequately represented in the parks system now.¹⁰

In keeping with increased use of state parks and based on its analysis of natural resource themes and public demand for more recreational areas, the NC Division of Parks and Recreation developed its *New Parks for a New Century* plan which identifies 13 potential new state parks, 33 potential state natural areas and one potential state recreation area (Map 4). If all 47 sites are added, the size of the state park system would double and make parks easily accessible to a larger percentage of the state's population.¹¹

⁶ Powell, William S. 1989. North Carolina through Four Centuries. The University of North Carolina Press. p. 449-450.

⁷ NC Division of Parks and Recreation. March 5, 2003. NC State Parks report record visitation in 2002. www.ils.unc.edu/parkproject/parknews/ releases/3_5.html/

⁸ NC Division of Parks and Recreation. Systemwide Plan for the North Carolina State Parks System, 2000-2005. p. VI-1. www.ils.unc.edu/parkproject/ swplan/home.html

⁹ State Parks Act of 1987 (G.S. 113-447 through 113-44.14)

¹⁰ NC Division of Parks and Recreation. Systemwide Plan for the North Carolina State Parks System, 2000-20005, Chapter IV. www.ils.unc.edu/ parkproject/swplan/home.html

¹¹ Ibid. IV 14-15. Based on a 1986 study of distances traveled by visitors to state parks, the NC Division of Parks and Recreation defines a park's primary service area as counties within a 50-mile radius. Analysis revealed that four areas had few parks within that radius: 1) Mecklenburg, Union and surrounding counties; 2) Guilford, Alamance and surrounding counties; 3) Cherokee, Clay and surrounding counties; and 4) Lenoir, Pitt, Wayne and surrounding counties.

Viewing Scenery

Key Finding: Over 70% of North Carolinians report that driving for pleasure and viewing scenery are popular outdoor activities for their households.

North Carolina has 45 scenic highways designated by the NC Department of Transportation and two national scenic highways, the Blue Ridge Parkway and the Cherohala Skyway. These routes display the diversity and beauty of the entire state.¹²

Of these routes, the most well known and popular place for driving for pleasure and viewing scenery is the Blue Ridge Parkway. In 2002, almost 14 million people visited the Parkway, and the average parkway visitor in North Carolina spent \$172 per day or \$603 during the average 3.5-day trip.¹³

<u>Key Recommendation</u>: Protecting vistas from development along officially-designated scenic highways ensures that their beauty is not lost.

Scenic highways, by definition, are long and narrow which means that most of what is visible is outside highway control. Along the Blue Ridge Parkway, for example, land use has changed dramatically since the road was built. In 1948, there were 40,000 farms along the parkway. Now, there are 10,000.¹⁴

Development is encroaching upon the Blue Ridge Parkway and can greatly diminish the scenic views and sweeping landscapes that make this area so special. A recent survey revealed that half of the visitors would stop visiting completely if views were to diminish past a certain point.¹⁵

The Design Research Center at NC State University has been mapping land visible from the parkway to help direct conservation efforts toward the most important views,¹⁶ and several statewide and local land trusts have been working with the National Park Service to protect land identified in this map.¹⁷

Local Recreation Such as Walking and Biking, Playgrounds, Swimming Pools and Soccer

Key Finding: Popular activities provided by local parks include walking and biking trails, playgrounds, swimming pools, open areas for activities such as kite-flying, sunbathing and picnicking, softball, baseball and basketball. North Carolina's growing population and the increase in the percent of the population that is obese means that local parks departments face a rapidly increasing need for their services.

Great cities and towns are known for their parks. Parks are playfields, ecology labs, kite flying fields, exercise trails, streams, amphitheaters for concerts and plays, greenway trails, gardens, wildlife habitat and quiet places to sit and enjoy a beautiful day.

¹² NC Department of Transportation. NC Scenic Highways. 144 p. Also see America's Byways website: www.byways.org

¹³ Matthews, Leah G. et al. 2003. Blue Ridge Parkway scenic experience project phase 2 final report. Blue Ridge Parkway Foundation. 65 p. www.nps.gov/blri/pphtml/documents.html

¹⁴ Ibid. p. 7.

¹⁵ Ibid.

¹⁶ Fes, John et al. 1995 to present. Visual sensitivity mapping of Blue Ridge Parkway viewsheds. NC State University, School of Design, Design Research Center.

¹⁷ For information about efforts to protect the Blue Ridge Parkway, see website of Conservation Trust for North Carolina, www.ctnc.org

North Carolina has a proud tradition in its local parks system. Our state has been a leader in visionary parks planning. Raleigh created the first greenway plan in the nation in the 1970s. As Raleigh's greenway has grown, its vision has also spread throughout the world and improved quality of life in thousands of towns and cities.

Many of the most popular outdoor activities in North Carolina are traditionally provided by city and county park systems. Because of the rapid growth in our population, county and municipal park systems across North Carolina are struggling to meet the burgeoning demand for parks.

Key Recommendation: More local parks and trails are needed to meet the need for active recreation and to provide safe and pleasant places to walk and bike.

Local parks and recreation departments need funding for three purposes: to acquire land for new and expanded parks, to renovate and enlarge outdated facilities and to build new facilities. To assess the magnitude of the need for park land and facilities in North Carolina, we surveyed the 218 city and county parks departments about their needs.

One hundred and eight responded and identified \$2.2 billion of need (see Appendix F for a list of needs by park department). Four hundred and fifty-nine million dollars are needed to acquire 34,000 acres of land, and \$1.8 billion is needed for new and renovated facilities.

Fishing, Hunting and Wildlife Watching

<u>Key Finding</u>: Thirty-nine percent of North Carolinians hunt, fish or watch wildlife, but as forests and farms have been developed the diversity of species where many people live has declined and more and more land is off limits to hunting, fishing and exploring.

When North Carolina was primarily a rural state, most people had easy access to places to hunt, fish and observe wildlife, but as forests and farms have been developed the diversity of species where many people live has declined and more and more of the remaining land is off limits to hunting, fishing and exploring.

Fishing, hunting and wildlife-watching are still very popular activities in North Carolina. Thirty-nine percent of North Carolinians hunt, fish or watch wildlife. Hunting and fishing are enjoyed by 17% of the population. Thirty-two percent, including some who are also sportsmen, like to observe, feed or photograph fish or wildlife. Many of these do so at their homes, but 27% of them also travel to do so.¹⁸

The NC Wildlife Resources Commission (WRC) helps meet the need for hunting and fishing by managing nearly two million acres of land for hunting, trapping and fishing. In the 2004-2005 season, 343,266 of these acres were owned by WRC, and the remainder were managed by WRC on land owned by the US Forest Service, the Army Corps of Engineers, other state agencies and private companies such as Progress Energy.¹⁹

Public places to watch wildlife are provided by a much broader diversity of agencies and organizations, from State Parks to National Forests to municipal greenways to nature preserves owned by private land trusts.

¹⁸ US Fish and Wildlife Service. 2002. 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation: State Overview. Preliminary Findings.

¹⁹ NC Wildlife Resources Commission. Visit a public game land this fall. October 15, 2004. Press release. http://216.27.49.98/news_stories/pg00_newsrelease/pg00_oct04_6.htm

Key Recommendation: We need to ensure that sufficient land is available for hunting, fishing and wildlifewatching.

To meet the need for additional wildlife habitat and hunting land, WRC has identified areas where they hope to acquire land (Map 5). Criteria used to identify critical tracts include wildlife habitat value and the availability of hunting land, particularly in urbanizing areas where people are finding it more difficult to hunt and fish. When deciding how much land to acquire and which areas to open to hunting, safety of hunters and neighbors are important factors in the decisions.

Local parks and greenways, close to people's homes, can be important and valued places for people to watch and learn about wildlife that thrives in urban and suburban settings. Local governments in North Carolina are interested in protecting more than 34,000 acres of land for local parks and greenways.

To observe species of wildlife that are more secretive or rare, it is necessary to visit natural areas that provide the habitat for that particular species. The NC Natural Heritage Program has published inventories of the most important natural areas in 68 of North Carolina's 100 counties, and most of the other counties have been studied to some degree through inventories of regional ecosystems such as the Albemarle Pamlico Estuarine system. To date, the Natural Heritage Program has documented 1,500 individual sites of national, state and regional significance.²⁰ Four hundred of these, totaling 1.57 million acres, have been protected, but 1,100 more, totaling one million acres, are as yet unprotected.²¹ State and local governments and nonprofit conservancies use the inventories to prioritize areas for protection.

Visiting Historic Sites

Key Finding: Sixty- two percent of North Carolinians visit historic sites each year, and there is high support for public funding to restore and open additional historic sites.

Across the state, people are working to preserve North Carolina's farms, archeological sites, mills and mill villages, county court houses, lighthouses, rural communities and downtowns that tell the story of this state and how we are different than other places.

Historic sites are maintained and opened to the public by a variety of government agencies and by private historic organizations. In North Carolina, there are 27 state-run historic sites ranging in age from Town Creek Indian Mound to the USS North Carolina Battleship.²² The National Park Service operates seven historic sites and trails including the Carl Sandburg home, Wright Brothers Memorial and Trail of Tears Historic Trail.²³ One of our most popular historic sites, the Biltmore Estate, is operated by a private for-profit company, and more than 400 other historical properties and museums are operated by private nonprofit groups, including Bellamy Mansion Museum in Wilmington, Hope Plantation in Bertie County, the Hayti Heritage Center in Durham, the Greensboro Historical Museum, Old Salem in Winston-Salem, and the C. Grier Beam Truck Museum in Cherryville.

Many historic properties that are not open to the public are also very important to our quality of life because of how they contribute to the sense of place and fabric of a community. North Carolina has over 2,100 listings on the National Register of Historic Places, and about 45 new nominations are submitted each year.

²⁰ NC Natural Heritage Program. www.ncnhp.org.

²¹ Data computed by NC Natural Heritage Program. E-mail correspondence from Scott Pohlman on June 30, 2004.

²² NC Historic Sites. Preserving the past for all people. http://www.ah.dcr.state.nc.us/sections/hs/default.htm, May 24, 2004

²³ National Park Service. List of national parks in North Carolina. http://data2.itc.nps.gov/parksearch/state.cfm?st=nc

Approximately 85% are privately-owned and 15% publicly-owned. Five percent are considered nationallysignificant properties.²⁴

About 300 of the 2,100 National Register sites are historic districts, some of which contain several hundred contributing historic buildings or sites. Types of districts include residential neighborhoods, commercial districts, archeological sites, industrial complexes, mill villages and rural farming districts. The National Park Service estimates that approximately 30,000 historic properties are listed in the National Register either as individual listings or as contributing properties within districts.²⁵

People often think of urban areas and individual buildings when they think of historic sites, but North Carolina has seven rural historic districts on the National Register and 35 more that are being considered for registry. These districts encompass larger collections of historic farms and surrounding fields and forests, including the 13,400-acre Lake Landing Plantations Historic District in Hyde County. Historic sites in rural areas are among the most threatened in North Carolina.

<u>Key Recommendation</u>: To maintain the historic value of these sites, it is important to preserve both the structures and the landscape which surrounds them.

Many of North Carolina's historic sites are endangered because resources are so limited for restoration and reuse and because of rapid development of land around them. For many historic sites, preservation of the surrounding landscape is as important as preservation of the structures. House in the Horseshoe in rural Moore County, Town Creek Indian Mound in the Pee Dee River Valley, the Biltmore Estate in Asheville and Somerset Place in Washington County would be greatly diminished if the landscapes around them did not resemble what they did at the time when history was first made at the site.

Critical needs in the next five years include:

Landscapes around NC Historic Sites Many of North Carolina's 27 State Historic Sites are in areas that are developing. For example, the last major Civil War battle raged in 1865 across 6,000 acres near Bentonville in rural southern Johnston County. Now the rural landscape in that area, just a few miles off I-95, is changing as houses and industries expand. The Bentonville Historic Site which protects only 5% of the original battlefield acreage has developed a plan to acquire scenic and farmland easements on an additional 1,200 acres to ensure that the most important battle sites and views are protected.

Archeological Sites The NC Office of State Archeology has identified many important archeological sites that are vulnerable to vandalism or to inadvertent destruction. These sites range from early Native American villages to battlefields to historic industrial sites. The Office of State Archeology proposes protecting these sites by acquiring easements and land.

Restoration, Repair and Improved Accessibility for Historic Sites Open to the Public Usually, the largest expense involved in operating historic sites that are open to the public is restoration and maintenance of the structures. Many more properties could be protected and accessible if funding were available to help governments and non-profits with these costs. In addition, many public historic buildings such as courthouses and schools need renovations to bring them up to current building and accessibility codes.

²⁴ NC State Historic Preservation Office. 2000. The National Register of Historic Places in North Carolina: Facts and Figures. http://www.hpo.dcr. state.nc.us/nrfacts.htm

²⁵ Ibid.

Revolving Fund Most historic properties are best managed by private individuals who live, work in and care for them while protecting their historic and scenic value for the public. In North Carolina, sixteen historical nonprofit organizations have used revolving funds to protect more than 1,000 private historic buildings from demolition and decay. They use the revolving funds to purchase the property. After closing, they place a permanent historic covenant on the property, ensuring that the key historic features of the building will be protected by future owners. They then resell the property to owners willing to use it within the restrictions in the covenants.

Establishing a state revolving loan fund that organizations and governments could borrow against to purchase properties could greatly expand the number of properties protected. Funds borrowed for purchase would be repaid when the property is re-sold and then re-used to protect another threatened property.

Inventories of Significant Historic Sites Governments and historic preservation organizations use inventories of the most important structures and sites in North Carolina to prioritize their work and educate the public and property owners about significant properties. North Carolina has not yet completed inventories of the most important historic sites in 42 counties, and many older inventories need updating to survey properties that were not yet old enough to be eligible for listing when the inventory was first completed.

Appendix D: Protecting Native Plants and Wildlife

Key Finding: North Carolina has some of the most extraordinary natural habitats in the world. Four of our five "ecoregions" are considered "globally outstanding" by international scientists, but 18% of North Carolina's native species are in danger of extinction and only small percentages of the state remain in natural habitat.

Because nature does not conform to the political lines drawn on a map, ecologists define ecological areas based on natural ranges. These ranges or *"ecoregions"* denote areas that have distinct natural communities and species, geology, climate, land use and hydrology. Ecologists have designated 76 river-based or "freshwater" ecoregions and 116 land-based or "terrestrial" ecoregions in North America.¹ Two of the freshwater ecoregions and three of the terrestrial ecoregions are found in North Carolina.

Biologists consider North Carolina's two freshwater ecoregions among the most biologically diverse ecoregions in the world. The ecoregion in North Carolina's Appalachian Mountains contains the highest level of freshwater diversity in North America and is possibly the most diverse temperate freshwater ecoregion in the world.² It has an extraordinary 231 fish species, and new species continue to be discovered. The conditions that have engendered this region's distinct fish fauna have also produced unusually large numbers of other aquatic species including 125 mussel and 65 crayfish species. The World Wildlife Fund considers this ecoregion endangered by every category of threat facing flowing-water systems: impoundment, channelization, pollution, sedimentation and urbanization.³

North Carolina's other freshwater ecoregion includes all the rivers and streams that flow into the Atlantic. Like the Appalachians it is unusually diverse compared to other temperate coastal ecoregions with more than 177 fish species, 59 mussels and 56 crayfish. Among 48 species of native fish found only in North Carolina are the Cape Fear shiner and the Waccamaw silverside, killifish and darter. New species may yet be discovered as this is the least studied ecoregion – "a veritable black hole of life history knowledge for fishes."⁴ The World Wildlife Fund considers the natural habitats in this ecoregion among the most critically endangered in North Carolina. At least 47 species of fish and mussels are at risk of extinction. Major threats include urban development, channelization, agricultural runoff and other nonpoint pollution and introduction of nonnative species.

As they have done with freshwater habitats, biologists have also divided North Carolina's land-based or terrestrial habitats into "ecoregions" that they can compare with ecoregions in other parts of the world. Our terrestrial habitats are also some of the most biologically diverse places on earth. We have 79 amphibians, more than any other state in the nation. Salamander species are particularly diverse in the Appalachian Mountains, and frogs and toads in the coastal plain. We rank sixth in the number of freshwater fishes; and eighth in the number of birds. We have a greater diversity of mammals than any state east of Texas.⁵

¹ Abell, Robin A. et al. 2000. Freshwater Ecoregions of North America: A Conservation Assessment. Island Press. And Ricketts, Taylor H. et al. 1999. Terrestrial Ecoregions of North America: A Conservation Assessment. Island Press.

² Abell, Robin A. et al. 2000. Freshwater Ecoregions of North America: A Conservation Assessment. Island Press. p. 212. "The Appalachian region is one of the oldest and least-disturbed landscapes on earth, having undergone slow erosion as a once-mighty range as high as the Himalayas. When ancient super-continents broke up around 200 million years ago, this vast mountain system broke into pieces and remnants drifted to present-day Greenland, Ireland, Great Britain, Norway, and North America. This last portion, by far the largest, today stretches from northern Alabama to Newfoundland. The native plants and wildlife in the northern Appalachians were covered by glaciers only ten to fifteen thousand years ago, so the ecosystems there are young in geologic terms. In contrast, the southern Appalachians have had a relatively stable landscape for 375 million years. In addition, species diversity has been encouraged by the area's geology: when the mountains were formed, the rock was folded in such a way that long, nearly continuous ridges and valleys were created. Because it is difficult to move from one valley to another, individuals of the same species were isolated from one another and more likely to evolve into new species specific to the valley in which they lived. The result is that the southern Appalachian Mountains exhibit extraordinary levels of biodiversity, probably the highest in the temperate world."

³ IIbid. p. 224.

⁴ Ibid. p. 225.

⁵ Stein, Bruce A. 2002. States of the Union: Ranking America's Biodiversity. NatureServe. www.natureserve.org. Tables F,G,I and J.

Two of our three terrestrial ecoregions, the Southern Blue Ridge and the Piedmont ecoregions, are the only "Temperate Broadleaf Mixed Forest Eoregions" in North America to be listed as globally outstanding.⁶ (Map 6) This ranking means that they are exceptional among all such forests in the world because of their diversity and rarity of species.⁷

In addition to being "globally outstanding," the Southern Blue Ridge ecoregion is considered one of six biological "hot spots" in the United States.⁸ This distinct area forms a center of richness and rarity because of the number of plants and animals that live here. Ecologists describe the history and unique nature of the Appalachians in this way:

Individual watersheds and peaks in the Appalachian chain, isolated by millions of years and boasting benign environmental conditions, provided a perfect setting for the evolution of unique species of plants, invertebrates, salamanders, crayfishes, freshwater mussels and fishes.

Southern Appalachian forests represent the last American stronghold of a forest type once widespread in the Northern Hemisphere. Strangely, the only other relict of these ancient forests to have escaped the ravages of time and climate change is thousands of miles away, in eastern China.⁹

Surprising to some, the ecoregion of North Carolina's Piedmont is also considered globally outstanding because its natural diversity is enhanced by species from the equally diverse Appalachians to the west and the longleaf pine forests to the south. This ecoregion also boasts 3,635 native herbaceous and shrub species, the highest number in North America.¹⁰

Ecologists consider North Carolina's third terrestrial ecoregion, the Mid-Atlantic Coastal Plain, "regionally outstanding," which means that its species diversity and rarity are outstanding when compared to the other 30 ecoregions of its type within North America (Map 6). Among its outstanding features, our coastal region contains the most diverse assemblage of freshwater wetlands in North America. River swamp forests with towering bald cypress and gum trees, pocosins¹¹ and Carolina bays¹² are some of the most fascinating and beautiful features of this area. As North Carolinians have experienced many times, these habitats are dynamic, with frequent hurricanes and floods in the bottomlands, coastal plains and maritime habitats, and fire historically prevalent in the drier areas. This interaction of moisture and fire creates tremendous species diversity.¹³

⁶ Ricketts, Taylor H. et al. 1999. Terrestrial Ecoregions of North America. Island Press. For the general reader of Saving the Goodliest Land, we have simplified the ecoregion names used in Ricketts et al. Appalachian/Blue Ridge Forests Ecoregion (Key #16) is here called Southern Blue Ridge ecoregion and the Southeastern Mixed Forests Ecoregion (Key #22) is here called Piedmont ecoregion.

⁷ Ibid. p. 33.

⁸ Stein, Bruce A. et al. 2000. Precious Heritage: The Status of Biodiversity in the United States. Oxford University Press. p. 190-191.

⁹ Ibid, p. 190-191

¹⁰ Ricketts, Taylor H. et al. 1999. Terrestrial Ecoregions of North America. Island Press. p. 263-267. In Ricketts et al., this ecoregion is called Middle Atlantic Coastal Forests (Key #50).

¹¹ Pocosins, from an ancient Algonquin term for "swamp on a hill," are extensive, flat, damp, sandy or peaty areas far from streams with a scattered growth of pond pine and a dense growth of mostly evergreen shrubs, that taken together, resemble a heath scrub community. Ricketts, Taylor H. et al. 1999. Terrestrial Ecoregions of North America. Island Press. p. 264.

¹² Carolina bays are ovate-shaped, shallow depressions that occur abundantly across a broad band of the coastal plan from southern North Carolina to the South Carolina-Georgia border. They represent a bog or bog-lake complex unique to the southeastern coastal plain and are thought to have been formed by a meteor or comet impact. Ricketts, Taylor H. et al. 1999. Terrestrial Ecoregions of North America. Island Press. p. 264.
¹³ Ibid. p. 33.

Despite the global significance of our natural environment, we have so dramatically altered North Carolina's ecosystems that large areas no longer maintain their original ecological processes.¹⁴ The NC Natural Heritage Program estimates that 18% of North Carolina's known native species are endangered, threatened or of special concern because of rarity.¹⁵ These changes have happened gradually over hundreds of years, so most of us do not realize how impoverished our natural world is compared to what it used to be. If we do not act quickly to save these extraordinary ecosystems and the species that live there, future generations will have no opportunity to regain what we have lost.

North Carolina's Piedmont ecoregion is considered critically endangered because only 1% of its natural areas remain intact. Unless immediate action is taken now to preserve and restore substantial areas, ecologists believe there is only a low probability that the Piedmont can maintain its extraordinary diversity. The other two ecoregions are somewhat more healthy, but only 17% of habitat in the Southern Blue Ridge and 12% in the Coastal Plain are estimated to remain intact. Once again, ecologists recommend swift action to preserve and restore substantial areas of habitat.¹⁶

<u>Key Recommendation</u>: To save our extraordinary ecosystems and the native plants and wildlife that depend on them, ecologists recommend protecting and restoring large blocks of unfragmented natural habitat.

When a forest is cleared of trees, we expect that, in time, a new forest will grow in its place. We imagine that the wildlife and birds move on to nearby forests. In reality, many of the birds and wildlife that lived in that particular patch of forest will die because adjacent habitat that suits each species is usually already populated with other individuals.¹⁷ Some of the plants may not grow back because of soil disturbance or because the parent population is no longer there to provide a seed source.

Native plants and wildlife that live in wild areas adjacent to the clearing may be impacted too. Cowbirds, for example, will colonize cleared areas because they need open fields to feed in. They fly into adjacent forests, however, to lay their eggs in the nests of other species, such as scarlet tanagers and hooded warblers. Those other birds cannot distinguish their babies from the cowbird chick, and they struggle to feed it at the expense of their own offspring.¹⁸ Gradually the forest species die out because their chicks are not growing to adulthood.

When a particular species is widespread and able to adapt to some changes in its habitat, timber harvesting or development is unlikely to threaten its existence unless the changes are very rapid and large in scale. However, some species are naturally rare or have very specific habitat requirements, and these species can be led to extinction relatively easily. For that reason, it is important to know more about which species and ecosystems are rare now and which are particularly vulnerable.

So what can North Carolina do to protect its extraordinary natural environments and the species that call them home? Ecologists recommend protecting large blocks of unfragmented natural habitats in each ecoregion with corridors of natural habitat between them so that species which seek to avoid both people and invasive species such as cowbirds can easily move from one habitat to another.

¹⁶ Ricketts, Taylor H. et. al. 1999. Terrestrial Ecoregions of North America. Island Press.

¹⁴ Ricketts, Taylor H. et al. 1999. Terrestrial Ecoregions of North America. Island Press.

¹⁵ Stein, Bruce A. 2002. States of the Union: Ranking America's Biodiversity. NatureServe. www.natureserve.org. p. 13. Species at risk include species on the federal list as endangered, threatened or candidates for listing or on the state list as endangered, threatened or special concern. For a more complete listing of species see NC Natural Heritage Program. 2004. List of the Rare Plant Species of North Carolina and NC Natural Heritage Program. 2004. List of Rare Animal Species of North Carolina. http://www.nchp.org/Pages/publications.html.

¹⁷ Wiley, Haven et al. 1999. Rating Land in Orange County by Its Wildlife Value. A Landscape with Wildlife: Part 2. Triangle Land Conservancy. Raleigh, NC. p. 7.

¹⁸ Ludington, Livy et al. 1997. A Landscape with Wildlife for Orange County. Triangle Land Conservancy. Raleigh, NC. p. 5.

Ecologists propose that core preserves be as large as possible because bigger reserves contain more species and genetic variation and allow more freedom for natural disturbances such as fire, floods and predators that are essential for healthy ecosystems.¹⁹ Protecting large core preserves without houses or roads allows natural disturbances to run their course without fear for public safety and property loss.

In addition to creating a system of core preserves, it is important to act now to protect areas where rare species still live and where natural habitat is most intact, even if these are not large areas at this time. As the system of core preserves and corridors grows larger, rare species protected on the smaller sites may be able to repopulate the core preserves as habitat there is restored.

Fortunately, North Carolina has been documenting the location of habitats of rare and endangered species and the most intact natural areas for many years, and we can target these areas for ecosystem preservation and interconnecting corridors.

To date, the NC Natural Heritage Program has published inventories of the most important natural areas in 68 of North Carolina's 100 counties, and most of the other counties have been studied to some degree through inventories of regional ecosystems such as the Albemarle Pamlico Estuarine system. Although the science involved in understanding complex ecosystems is evolving, the inventories provide a strong scientific basis for decisions about locations and size of areas and corridors needed to save imperiled species and allow ecosystems to function properly.

To date, the Natural Heritage Program has documented 1,500 individual sites of national, state and regional significance.²⁰ Four hundred of these, totaling 1.57 million acres, have been protected, but 1,100 more, totaling one million acres, are as yet unprotected.²¹

State and local governments and nonprofit conservancies use the inventories to prioritize areas for protection, and state, federal and some local governments require that the Natural Heritage Program be consulted before development projects are undertaken.

Examples of how the inventories are used include:

- The NC Division of Parks and Recreation's plan for new state parks used the inventories to identify natural communities not now represented in the park system and to select sites for new state parks that represent those communities.²²
- The NC Wildlife Resource Commission has developed a new Comprehensive Wildlife Conservation Strategy which uses the natural heritage data to identify habitat for important wildlife species.²³
- The Piedmont Triad Council of Governments used the inventory data as it developed a regional open space plan with its twelve member counties.²⁴
- The NC Natural Heritage Trust Fund and the NC Clean Water Management Trust Fund prioritize grants to projects that protect natural heritage inventory sites.

¹⁹ McNaught, David and T. Edward Nickens. 2003. Horizon 2100: Aggressive Conservation for North Carolina's Future. Environmental Defense, Raleigh, NC. p. 14-15. This report can also be accessed at http://www.environmentaldefense.org/go/nchorizon. The report was written under the guidance of a panel of conservation scientists including the directors of the NC Museum of Natural Sciences, the NC Zoological Park, and the NC Botanical Garden; five distinguished professors of biology, landscape ecology and environmental science; a community ecologist with the NC Natural Heritage Program; and a senior scientist at Environmental Defense.

²⁰ NC Natural Heritage Program. www.ncnhp.org.

²¹ Data computed by NC Natural Heritage Program. E-mail correspondence from Scott Pohlman on June 30, 2004.

²² NC Division of Parks and Recreation. New Parks for a New Century. http://ils.unc.edu/parkproject/explor/plan.html

²³ NC Wildlife Commission. Comprehensive Wildlife Conservation Strategy. http://216.27.49.98/pg07_WildlifeSpeciesCon/pg7c1.htm

²⁴ Kron, Paul et al. 2003. Piedmont Triad Regional Open Space Strategy. Piedmont Triad Council of Governments. www.ptgog.org.

• Nonprofit land conservancies use the natural heritage data to identify priority sites for conservation. Examples are found in the 49 conservation plans prepared by local and regional land trusts to identify priority areas for protection along rivers and streams in North Carolina.²⁵

A panel of some of North Carolina's most distinguished scientists recommend that approximately 30% (10 million acres) of North Carolina's landscape be managed as natural area preserves and corridors if we hope to protect North Carolina's natural environment and the diverse species with which we share this beautiful state.²⁶

Although at first glance 30% sounds like a very large amount of land to preserve in a natural state, some of the biggest cities in the United States have set aside close to 20% of the land within city boundaries as parkland. For example, 19.8% of San Francisco is parkland; 19.3% of Washington DC; 18.9% of New York; and 17.6% of Boston.²⁷ If these dense cities can preserve that amount of land for their citizens and environment, North Carolina, with its great diversity of urban and rural areas, should be able to protect 30% as natural areas. Currently, approximately 3.04 million acres (10%) of North Carolina is permanently protected land,²⁸ so North Carolina already has a base to build on, including the core preserves in each ecoregion identified in Table D1.

²⁵ The "riparian corridor conservation plans" were funded through a grant from the NC Clean Water Management Trust Fund to Conservation Trust for North Carolina. For more information, see www.ctnc.org.

²⁶ McNaught, David and T. Edward Nickens. 2003. Horizon 2100: Aggressive conservation for North Carolina's future. Environmental Defense.

²⁷ Harnik, Peter. 20003. The Excellent Park City Park System: What Makes It Great and How to Get There. The Trust for Public Land. P. 38. www.tpl.org

²⁸ NC Department of Environment and Natural Resources. 2001. NC Million Acre Initiative Annual Report. As of December 31, 1998, NC DENR estimated that 2.76 million acres in North Carolina were permanently protected. The most recent million acres annual report documents that an additional 280,342 had been protected as of December 31, 2003.

Table D1: Biological Distinctiveness and Conservation Status of North Carolina's Ecoregions ²⁹					
Ecoregion	Biological Distinct- iveness	% of Intact Habitat ³⁰	Conservation Status ³¹	Threats and Causes of Degradation	Largest, most intact areas in NC
Southern Blue Ridge (Terrestrial)	Global	17%, most remaining intact habitat is at higher elevations	Vulnerable	Conversion to agriculture/ development, particularly at lower elevations; logging, acid rain; pests and diseases have killed chestnut, spruce, hemlock, dogwood	Great Smoky Mountain National Park, Pisgah National Forest, Blue Ridge escarpment and the Amphibolite, Brushy and Nantahala mountains
Tennessee- Cumberland (Freshwater)	Global	N/A	Endangered	Impoundment, channelization, pollution, sedimentation particularly from logging steep slopes and agricultural clearing of riparian vegetation, urbanization, introduction of invasive zebra mussels	
Piedmont (Terrestrial)	Global	1%	Critical	Most altered ecosystem in NC; repeatedly logged, now largely converted to agriculture/ urban areas; suppression of natural fires/ extinction of predators major problems	Uwharries, Sauratown Mountains, Brushy Mountains, South Mountains – most of these in relatively poor condition
Coastal Plain (Terrestrial)	Regional	12%	Endangered	Conversion to agriculture, fire suppression, urbanization, ditching and draining of wetlands, damming of rivers	Lake Waccamaw and River; Brunswick Co Pinelands; Bladen Lakes State Forest; Holly Shelter and Sandhills game lands; Camp Lejeune and Fort Bragg; Croatan National Forest, Outer Banks; Pamlimarle Peninsula; Roanoke, North and Northwest rivers; Great Dismal Swamp
South Atlantic (Freshwater)	Global	N/A	Critical	Urban development, channelization, agricultural runoff and other nonpoint source pollution, impoundment, introductions of nonnative species	

²⁹ Ricketts, Taylor H. et al. 1999. *Terrestrial Ecoregions of North Carolina*. Island Press.

³⁰ Ibid. p. 437. Intact habitat is defined as "relatively undisturbed areas characterized by the maintenance of most original ecological processes and by communities with most of their original native species till present."

³¹ Ibid. p. 434-440. This ranking system includes five levels. From greatest to least threat, the levels are critical, endangered, vulnerable, relatively stable and relatively intact. Critical ecoregions are judged to have a low probability of persistence of remaining intact habitat unless immediate protection action is taken. Endangered are judged to have a medium to low probability of persistence. Vulnerable are judged to have a good probability of persistence of remaining intact habitat but also of loss of sensitive or exploited species.